

## WHAT IS CLAIMED IS:

- 1 1. A multilayer wiring board, comprising:  
2 a metal substrate having first and second main  
3 surfaces;  
4 a copper coating applied to at least one of the first  
5 and second main surfaces of the metal substrate and having  
6 a roughened surface; and  
7 an insulating resin layer formed on the roughened  
8 surface of the copper coating.
- 1 2. The multilayer wiring board according to Claim 1,  
2 further comprising:  
3 a wiring layer arranged on the insulating resin layer;  
4 and  
5 a via extending through the insulating resin layer  
6 between the copper coating and the wiring layer.
- 1 3. The multilayer wiring board according to Claim 1,  
2 wherein the copper coating has a thickness smaller than that  
3 of the metal substrate.
- 1 4. The multilayer wiring board according to Claim 1,  
2 wherein the copper coating is a copper plating.
- 1 5. The multilayer wiring board according to Claim 1,  
2 wherein the roughened surface of the copper coating has an  
3 arithmetic mean roughness Ra of 0.1 to 10  $\mu\text{m}$ .
- 1 6. The multilayer wiring board according to Claim 1,  
2 wherein the metal substrate is a rolled plate of metal or metal

3 alloy having a thickness of having a thickness of 150  $\mu\text{m}$  or  
4 larger.

1 7. The multilayer wiring board according to Claim 1,  
2 further comprising an undercoat layer between the metal  
3 substrate and the copper coating, the undercoat layer being  
4 made of either one of nickel, cobalt and chrome and having  
5 a thickness smaller than that of the copper coating.

1 8. A multilayer resin wiring board, comprising:  
2 a metal substrate having first and second main surfaces  
3 and defining therein a through hole extending between the  
4 first and second main surfaces;  
5 a copper coating applied to the first and second main  
6 surfaces of the metal substrate and an inner surface of the  
7 through hole and having a roughened surface;  
8 a plurality of insulating resin layers and wiring  
9 layers formed on the roughened surface of the copper coating  
10 to be located on the first and second main surfaces of the  
11 metal substrate, the insulating resin layers being interposed  
12 between the copper coating and the wiring layers or between  
13 the copper coating and the wiring layers and between the  
14 wiring layers;  
15 a resin filler filled in the through hole;  
16 a first via extending through the insulating resin  
17 layer between the copper coating and the wiring layer; and  
18 a second via extending through the resin filler and the  
19 insulating resin layers between the wiring layer located on  
20 the first main surface and the wiring layer located on the  
21 second main surface while being kept insulated from the metal  
22 substrate.

1 9. The multilayer wiring board according to Claim 8,  
2 wherein the copper coating has a thickness smaller than that  
3 of the metal substrate.

1 10. The multilayer wiring board according to Claim 8,  
2 wherein the copper coating is a copper plating.

1 11. The multilayer wiring board according to Claim 8,  
2 wherein the roughened surface of the copper coating has an  
3 arithmetic mean roughness Ra of 0.1 to 10  $\mu\text{m}$ .

1 12. The multilayer wiring board according to Claim 8,  
2 wherein the metal substrate is a rolled plate of metal or metal  
3 alloy having a thickness of 150  $\mu\text{m}$  or larger.

1 13. The multilayer wiring board according to Claim 8,  
2 further comprising an undercoat layer between the metal  
3 substrate and the copper coating, the undercoat layer being  
4 made of either one of nickel, cobalt and chrome and having  
5 a thickness smaller than that of the copper coating.

1 14. A method of manufacturing a multilayer wiring board,  
2 comprising:

3 preparing a metal substrate having first and second  
4 main surfaces;

5 applying a copper coating to at least one of the first  
6 and second main surfaces of the metal substrate;

7 surface roughening the copper coating to form a  
8 roughened surface on the copper coating;

9 forming an insulating resin layer to the roughened

10 surface of the copper coating; and  
11 arranging a wiring layer on the insulating resin layer.

1 15. The method according to Claim 14, wherein the copper  
2 coating is formed by copper plating.

1 16. The method according to Claim 14, wherein the copper  
2 coating has a thickness of 10  $\mu\text{m}$  or larger before the surface  
3 roughening, and has a thickness of 5  $\mu\text{m}$  or larger after the  
4 surface roughening.

1 17. A method of manufacturing a multilayer wiring board,  
2 further comprising:

3 preparing a metal substrate having first and second  
4 main surfaces;

5 defining a through hole in the metal substrate;

6 plating the metal substrate with copper to apply a  
7 copper coating to the first and second main surfaces of the  
8 metal substrate and an inner surface of the through hole;

9 surface roughening the copper coating to form a  
10 roughened surface on the copper coating;

11 forming insulating resin layers on the roughened  
12 surface of the copper coating so as to be located on both the  
13 first and second main surfaces of the metal substrate;

14 arranging wiring layers on the respective insulating  
15 resin layers;

16 filling a resin filler in the through hole;

17 providing a first via extending through the insulating  
18 resin layer between the copper coating and the wiring layer;

19 and

20 providing a second via extending through the resin

21 filler and the insulating resin layers between the wiring  
22 layer located on the first main surface and the wiring layer  
23 located on the second main surface while being kept insulated  
24 from the metal substrate.

1 18. The method according to Claim 17, said defining  
2 comprising:

3 forming a mask on the metal substrate in a predetermined  
4 pattern;

5 after said mask forming, photoetching the metal  
6 substrate from both the first and second main surfaces to  
7 thereby define the through hole; and

8 removing the mask after said photoetching,

9 wherein said plating is done by electroplating after  
10 said removing, and said filling is done simultaneously with  
11 forming the insulating resin layers on the copper coating.

1 19. The method according to Claim 17, wherein the copper  
2 coating has a thickness of 10  $\mu\text{m}$  or larger before the surface  
3 roughening, and has a thickness of 5  $\mu\text{m}$  or larger after the  
4 surface roughening.

1 20. A substrate material for a multilayer wiring board,  
2 comprising:

3 a metal substrate being a rolled plate of Fe-Ni alloy  
4 formed with a thickness of 150  $\mu\text{m}$  or larger and having first  
5 and second main surfaces; and

6 a copper coating applied to at least one of the first  
7 and second main surfaces of the metal substrate, having a  
8 roughened surface and being formed with a thickness of 5  $\mu\text{m}$   
9 or larger.

1 21. The substrate material according to Claim 20, wherein  
2 the roughened surface of the copper coating has an arithmetic  
3 mean roughness Ra of 0.1 to 10  $\mu\text{m}$ .

1 22. A substrate material for a multilayer wiring board,  
2 comprising:

3 a metal substrate being a rolled plate of Fe-Ni alloy  
4 formed with a thickness of 150  $\mu\text{m}$  or larger, having first and  
5 second main surfaces and defining therein a through hole  
6 extending between the first and second main surfaces; and  
7 a copper coating applied to the first and second main  
8 surfaces of the metal substrate and an inner surface of the  
9 through hole and having a roughened surface.

1 23. The substrate material according to Claim 22, wherein  
2 the roughened surface of the copper coating has an arithmetic  
3 mean roughness Ra of 0.1 to 10  $\mu\text{m}$ .